REMARKS

Status of Claims:

Claims 1, 3, 7, and 9 remain cancelled.

Thus, claims 2, 4-6, 8, and 10-13 are present for examination.

Claim Rejection under 35 U.S.C. 112:

Claims 4 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claims 4 and 10, as amended, the rejection is respectfully traversed.

The Examiner states that, "[t]he term 'sufficient' in claims 4 and 10 is a relative term which renders the claim indefinite." (Office Action; page 2).

Claims 4 and 10 have been amended, and the word "sufficient" has been removed from claims 4 and 10.

Therefore, claims 4 and 10, as amended, are believed to be in compliance with the requirements of 35 U.S.C. 112, second paragraph.

Claim Rejections under 35 U.S.C. 102 and 103:

Claims 2, 6, 8, 12, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. ("GPS Time Series Modeling by Autoregressive Moving Average Method: Application to the Crustal Deformation in Central Japan", The Society of Geomagnetism and Earth, Planetary and Space Sciences, 2000, pages 155-162) (hereinafter Li).

Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of www.trade10.com (May 14, 2001, pages 1-3) (hereinafter Trade10).

Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Biliris et al. (U.S. Patent No. 6,055,491) (hereinafter Biliris).

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With respect to claims 2, 4-6, 8, and 10-13, as amended, the rejections are respectfully traversed.

Independent claim 2, as amended, recites an outlier and change point detection device, comprising:

"a first time-series model learning device for learning a probability distribution of sequentially input data as a time-series statistic model specified by a finite number of parameters;

an outlier score calculator for reading the parameters obtained through learning by said first time-series model learning device, and for calculating an outlier score of the data based on the read parameters of the time-series statistic model and the input data, and for outputting the outlier score;

a **moving average calculator** for <u>sequentially reading each outlier score</u> calculated by said outlier score calculator, and **for calculating a moving average of the read outlier scores**;

a second time-series model learning device for sequentially reading <u>each moving average of the read outlier scores</u> calculated by said moving average calculator, and for learning a particular probability distribution <u>for the read moving averages</u> as a particular time-series statistic model specified by a finite number of particular parameters; and

a <u>change point score calculator</u> for reading the particular parameters obtained through learning by said second time-series model learning device, and <u>for calculating a particular outlier score for each moving average</u> calculated by the moving average calculator **based on** the read particular parameters of the particular time-series model and **the moving average calculated by the moving average calculator**, and for outputting the particular outlier score for each moving average as a change point score of the data." (Emphasis Added).

An outlier and change point detection device including the above-quoted features has at least the advantages that: (i) a <u>moving average calculator</u> allows for sequentially reading each outlier score calculated by an outlier score calculator, and **for calculating a moving average of the read outlier scores**; and (ii) a change point score calculator allows for reading particular parameters obtained through learning by a second time-series model learning device, and <u>for calculating a particular outlier score for each moving average</u> calculated by the moving average calculator **based on** the read particular parameters of the particular time-series model and **the moving average calculated by the moving average calculator**, and for outputting the particular outlier score for each moving average as a change point score of the data. (Specification; page 18, line 13 – page 22, line 7; Fig. 3)

Li neither discloses nor suggests an outlier and change point detection device including the above-quoted features with (i) a <u>moving average calculator</u> that allows <u>for calculating a moving average of outlier scores</u>, and (ii) a change point score calculator that allows for calculating a particular outlier score <u>for each moving average calculated by the moving average calculator</u> <u>based on</u> particular parameters of a particular time-series model and <u>the moving average calculated by the moving average calculator</u>.

The Examiner points to the residuals $\epsilon(t,\theta)$ of Li as being outlier scores, and points to the white Gaussian noise $w(t)$ of Li as being change point scores. (Office Action; page 3). Then, the Examiner points to Li (page 155, C2, L5-10; page 156, C2, L8-16; Fig. 1) as disclosing, "a <u>moving average calculator</u> for sequentially reading each outlier score calculated by said outlier score calculator and <u>for calculating a moving average of the read outlier scores</u>". (Office Action; page 4) (Emphasis Added). The Examiner stated that, "<u>using the ARMA method to detect outliers</u> and improve the time series <u>is calculating a moving average of the outlier scores</u>". (Office Action; page 4) (Emphasis Added).

However, Li does <u>not</u> disclose or suggest a moving average calculator for calculating a moving average of the residuals $\epsilon(t,\theta)$. The Examiner points to Li, page 155, C2, L5-10, as disclosing such a feature. However, the cited portion of Li merely states the following:

"In the present research, a method based on the recursive parameter estimation is applied first to detect them. Then the autoregressive moving average (ARMA) method is used to improve the time series of daily position changes. The <u>outliers are eliminated</u> by using robust estimation techniques during the ARMA process." (Li, page 155, C2, L5-10) (Emphasis Added).

In the above-cited portion of Li, there is <u>no</u> mention of calculating a moving average of the residuals $\epsilon(t,\theta)$. On the contrary, Li merely states that "outliers are eliminated". (Li, page 155, C2, L5-10). Eliminating outliers is <u>not</u> the same as <u>calculating a moving average</u> of outlier scores.

The Examiner further points to Li, page 156, C2, L8-16, as disclosing a moving average calculator for calculating a moving average of outlier scores. However, the cited portion of Li merely states the following:

"One important advantage of the ARMA method mentioned above is the <u>detection of outliers</u> in the time series by using robust norms (Ljung, 1987). We define that an observation to be an outlier if $\epsilon(t,\theta) > 2E[\epsilon^2(t,\theta)]$. They are very easily detected by <u>plotting the residuals</u> $\epsilon(t,\theta)$. Figure 1 shows the improved time series at the site of Chichibu by this approach. Observations with <u>red circles are outliers</u>. It can be seen that the noise was decreased greatly, and the changes of the position were clearly shown." (Li; page 156, C2, L8-16) (Emphasis Added).

In the above-cited portion of Li, there is <u>no</u> mention of <u>calculating a moving average of the residuals</u> $\epsilon(t,\theta)$. Rather, Li merely mentions <u>detecting outliers</u> and <u>plotting the residuals</u>. (Li; page 156, C2, L8-16). Detecting outliers and plotting residuals is <u>not</u> the same as <u>calculating a moving average</u> of outlier scores. Moreover, Fig. 1 of Li merely illustrates outliers with red circles, and neither discloses nor suggests <u>calculating a moving average</u> of outlier scores.

As a consequence, Li neither discloses nor suggests an outlier and change point detection device with (i) a <u>moving average calculator</u> that allows <u>for calculating a moving</u>

average of outlier scores, and (ii) a change point score calculator that allows for calculating a particular outlier score <u>for each moving average calculated by the moving average calculator based on</u> particular parameters of a particular time-series model and <u>the moving average calculated by the moving average calculator</u>.

Therefore, independent claim 2, as amended, is neither disclosed nor suggested by the Li reference and, hence, is believed to be allowable.

Independent claim 8 recites an outlier and change point detection method with features similar to features of an outlier and change point detection device of independent claim 2 and, thus, is believed to be allowable for at least the same reasons that independent claim 2 is believed to be allowable.

Independent claim 13 recites a device with features similar to features of an outlier and change point detection device of independent claim 2 and, thus, is believed to be allowable for at least the same reasons that independent claim 2 is believed to be allowable.

The dependent claims are deemed allowable for at least the same reasons indicated above with regard to the independent claims from which they depend. With respect to dependent claims 4 and 10, it is noted that Trade10 does <u>not</u> cure the deficiencies with regard to the teaching of Li discussed above. Thus, the Patent Office has <u>not</u> made out a *prima facie* case of obviousness under 35 U.S.C. 103. With respect to dependent claims 5 and 11, it is noted that Biliris does <u>not</u> cure the deficiencies with regard to the teaching of Li discussed above. Thus, the Patent Office has <u>not</u> made out a *prima facie* case of obviousness under 35 U.S.C. 103.

Conclusion:

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-0872. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-0872.

If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-0872.

Respectfully submitted,

Date   January 22, 2007   By   _____

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